Claims

What is claimed is:

1. A system, comprising:

at least one video camera to capture warped panoramic video images of a scene and to produce a video stream; and

a digital processor to receive and process said video stream, said digital processor comprising:

a first processing module to unwrap said warped panoramic video images to produce rectilinear video images of the scene, wherein said first processing module provides pan, tilt, and zoom adjustments to allow for customized viewing of the scene, and

a second processing module to detect and track a person's head in the rectilinear video images and to extract video images in the person's view from the rectilinear video images.

2. The system as in claim 1, wherein said second processing module performs an edge detection in the rectilinear video images to extract features and an ellipse detection to extract possible head images.

3. The system as in claim 1, wherein said second processing module performs Kalman filtering to predict an orientation of and track motion of the person's head.

4. The system as in claim 1, further comprising a mechanism to produce a warning signal according to the orientation of the person's head.

5. The system as in claim 1, wherein said digital processing comprises a third processing module to process images of a face from streaming video images to for face recognition.

6. The system as in claim 5, wherein said third processing module performs a single-frame subspace feature analysis on the steaming video images to produce a sequence of classification results and a sequence of feature vectors and then processes said sequences separately to produce face recognition outputs.

7. The system as in claim 6, wherein said third processing module is configured to apply a majority decision rule in processing the sequence of classification results.

8. The system as in claim 6, wherein said third processing module is configured to apply a discrete hidden Markov model decision rule in processing the sequence of classification results.

9. The system as in claim 6, wherein said third processing module is configured to apply a continuous density hidden Markov model decision rule in processing the sequence of feature vectors.

10. The system as in claim 1, further comprising a mechanism to measure a facial temperature pattern of a person.

11. The system as in claim 1, further comprising a mechanism for performing a facial affect analysis on a person.

12. The system as in claim 1, further comprising a mechanism for performing a speech affect analysis.

13. The system as in claim 1, further comprising a plurality of video cameras to capture warped panoramic video images of the scene at different locations, wherein said

interface with pan, tilt, and zoom adjustments to allow for customized viewing at each video receiver.

19. The system as in claim 18, wherein said video servo includes a digital process to tracks a change in the scene and adjusts filtering in a filtered video stream according to the change in the scene.

20. The system as in claim 18, wherein one video receiver includes a PDA.

21. The system as in claim 18, wherein one video receiver includes a laptop computer.

22. The system as in claim 18, wherein one video receiver includes a desktop computer.

23. The system as in claim 18, where said video camera is an omni-directional video camera to capture a 360-degree view of the scene.

24. The system as in claim 18, wherein said digital processor includes a video-based face recognition module which processes multiple images of a face from a video to perform face recognition.

25. The system as in claim 18, wherein said digital processor includes a module that detects and tracks a person's head.

26. The system as in claim 25, wherein said module further detects a face orientation of the person.

digital processor processes signals from said plurality of video cameras and said one video camera to detect and tract movement of an object in the scene.

14. The system as in claim 13, wherein said digital processor performs shadow detection from each video signal from each video camera to segment the object from the scene.

15. The system as in claim 14, wherein said digital processor performs a triangulation according to positions of the video cameras to produce horizontal positions x, y of the object and a height estimation algorithm to produce averaged vertical position z of the object.

16. The system as in claim 15, wherein said digital processor registers a track of movement for the object according to x and y positions.

17. The system as in claim 15, wherein the triangulation is performed by using an extended N-ocular algorithm.

18. A system, comprising:

at least one video camera to capture warped panoramic video images of a scene and to produce a video stream;

a video transmission mechanism to deliver said video stream to a plurality of video receivers, said video transmission mechanism comprising a video server which filters information in said video stream according to security levels assigned to video receivers to produce different filtered video streams to different video receivers; and

a digital processor in each video receiver to independently process said video stream to unwrap said warped panoramic video images to produce rectilinear video images of the scene, said digital processor having a user graphic

27. The system as in claim 26, wherein said module further extracts a video image in the person's view from the video according to estimated face orientation.

28. The system as in claim 18, wherein said digital processor includes a tracking module to detect and track a location of an object or a person in real time.

29. The system as in claim 18, wherein said video transmission mechanism includes a wired communication link.

30. The system as in claim 18, wherein said video transmission mechanism includes a wireless communication link.

31. The system as in claim 18, wherein said video transmission mechanism includes a video server that removes selected image information from a video signal to send a modified video signal to a video receiver.

32. A system, comprising:

at least one video camera to capture warped panoramic video images of a scene and to produce a video stream; and

a digital processor to receive and process said video stream, said digital processor comprising:

a first processing module to unwrap said warped panoramic video images to produce rectilinear video images of the scene, wherein said first processing module provides pan, tilt, and zoom adjustments to allow for customized viewing of the scene, and

a second processing module to extract a face from the streaming rectilinear video images and to perform face recognition on the extracted face.

33. A system, comprising:

at least one video camera to capture warped panoramic video images of a scene and to produce a video stream;

a video transmission mechanism to deliver said video stream to a video receiver; and

a digital processor in said video receiver to process said video stream to unwrap said warped panoramic video images to produce rectilinear video images of the scene,

wherein said digital processor includes a user graphic interface with pan, tilt, and zoom adjustments to allow for customized viewing of the scene, and said digital processor is operable to superimpose a customized video of the scene over a digital image.

34. The system as in claim 33, wherein said digital image is a map of an area including the scene.